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USSR Report

ECONOMIC AFFAIRS

(FOUO 16/80)

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CONTENTS

REGIONAL DEVELOPMENT

CREATION OF STABLE FOOD BASE IN FAR EAST URGED

Moscow VOPROSY EKONOMIKI in Russian No 9, Sep 80 pp 47-54

[Article by A. Zel'dner, Khabarovsk: "Creation of a Stable Food Base for the Far East"]

[Text] During the years which have elapsed since the March (1965) Plenum of the CC CPSU, the volume of fixed production capital in agriculture in the Far East has increased by a factor of more than 3, mineral fertilizer deliveries -- by a factor of 3.5 and the area of irrigated land has increased by a factor of almost 7. The overall volume of grain production increased by 60 percent, milk -- by 20, meat of all types -- by 42 percent and eggs -- by a factor of 2.2. However, the successes achieved still do not make it possible to satisfy fully the requirements of the region's population for a number of food products. In connection with the need for sharply increasing the rates of production for agricultural products, L.I. Brezhnev stated: "Take the Far East. Each year, large quantities of meat, eggs, dairy and other products are imported into this region. Certainly, this practice cannot be eliminated immediately. But we are obligated to establish a task and, within a brief interval of time, solve the problem concerned with ensuring that this region is supplied with locally produced poultry meat, milk, eggs and also vegetables"*.

In the region under review and from a soil-climatic standpoint, Amurskaya Oblast and Primorskiy and Khabarovskiy krays are considered to be the most favorable areas for the growing of agricultural crops. More than four fifths of the population in the Far East are concentrated in this territory, almost the same proportion of industrial output is manufactured here and up to 90 percent of the gross agricultural output in the Far East is produced within this territory. At the present time however, the proportion of agricultural output for the region with regard to the overall production volume for the RSFSR is negligible and amounts to just slightly more than 1 percent for grain crops, for potatoes -- 2 percent, for vegetables -- 3.8 percent and for milk and meat -- 2.5 percent. On the average, the annual per capita production of vegetables in the public sector is 49 kilograms, potatoes -- 87 kilograms, meat -- 25 kilograms, milk -- 136 liters and eggs -- 239**.

* L.I. Brezhnev, "Leninskim Kursom" [Following Lenin's Plan], Vol 3, Politizdat, 1973, p 78.

** Included in the computations are data for the public sector on production in Khabarovskiy and Primorskiy krays and in Amurskaya, Kamchatskaya, Magadanskaya and Sakhalinskaya oblasts during 1977.

In order to ensure that the per capita consumption level for locally produced food products conforms with the recommended feeding norms, the production of products should be increased by a factor of 2-3 (with the exception of potatoes and eggs, the production of which is adequate at the present time for satisfying the requirements of the local population). The shortage in agricultural products is covered mainly by importing meat, vegetables, fruit, sweet butter and powdered milk from other regions of the country. These imported agricultural products eliminate to a considerable degree the deficiency in food goods*.

Owing to an existing tradition, the production of agricultural products differs throughout the region's krays and oblasts. A large portion of these products is produced in Amurskaya Oblast (grain crops, soybeans, potatoes, meat of large-horned cattle). Considerable quantities of vegetables, milk and pork are produced at sovkhozes and kolkhozes in Primorskiy Kray. Of the overall gross output total for the southern zone of the Far East, 43 percent is produced in Amurskaya Oblast, 41 percent in Primorskiy Kray and 16 percent in Khabarovskiy Kray. During the past decade, the average annual rates for growth in this output throughout the region did not exceed three percent. At the same time, according to estimates prepared at IEI [Institute of Economic Studies] of DVNTs AN SSSR [Far East Scientific Center of the USSR Academy of Sciences, these rates must be raised to 5-6 percent annually in order to be able to supply the local population with all of the difficult to transport and perishable products required by 1990.

The economic and geographic importance of the Soviet Far East, the tremendous natural resources and the need for developing these resources require the creation in the region of a stable food base. In particular, the role and importance of such a base have increased in connection with the construction of BAM [Baykal-Amur Mainline]. As yet, the zone in which this construction project lies is only sparsely populated. The above-mentioned conditions are of exceptional importance with regard to attracting the rural population. Higher wages alone are not sufficient for ensuring a greater flow of new settlers or their acclimatization. Under extreme conditions, such wages will produce results only if commodity resources are available for purchase in the volumes and varieties required, including the creation in the zone of cultural-domestic conditions which are on a par with those traditionally found in populated regions.

An important factor for ensuring the availability of labor resources and for attracting them is that of solving the food problem. Scientific studies and the experience accumulated in developing a number of northern regions in the country have made it possible to develop the principal trends for creating a food base for the BAM zone. These include the supplying of difficult to transport and perishable products by means of local production, the intensification of the production of agricultural products in neighboring farming regions considered to be more favorable from the standpoint of climate and the importing of fruits, melons and other food goods from the southern regions of the country.

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* In 1978, on the average for the RSFSR, per capita consumption of the principal food products was as follows: meat -- 61 kilograms, milk -- 338, potatoes -- 129, vegetables -- 86, grain products -- 131 kilograms and eggs -- 270 (see "Narodnoye khozyaystvo SSSR v 1978" [National Economy of the USSR in 1978]. Izd. Statistika, 1979, p 217).

One additional source for procuring food products in the zone of the mainline continues to be that of hunting and the gifts of the taiga (wild game, meat of hoofed animals, berries, ferns, mushrooms, cedar nuts). In particular, special emphasis should be given to one very important source of protein -- fish. Special measures are obviously required for ensuring that the inhabitants of the Far East, in view of the shortage of meat products, are able to procure definite quantities of fish of the salmon strains. Many scientific recommendations have already been implemented: where such work is possible, new agricultural enterprises are being created, equipment, livestock and fertilizer are being imported and existing hothouses are being expanded and new ones built. However, the traditional approach to solving the food problem of BAM predominates -- the development of each oblast and kray for the purpose of self-support in terms of agricultural products and this, in our opinion, precludes the possibility of carrying out the assigned tasks completely.

As the principal source for supplying the population with full-value protein products, agriculture in the Far East, owing to conditions which developed over a period of many years, has not undergone proper development. The main flow of capital investments during the initial five-year plans was aimed at developing the extractive branches and the timber and processing industry. As a result, the modern structure of the region's national economy is distinguished by an exceptionally high level of development for the Group "A" branches and by a lagging behind of the Group "B" branches. Agriculture constitutes only 11 percent of the gross social product, whereas for the country on the whole -- roughly 15 percent. And at the present time, notwithstanding a considerable increase in the volume of capital investments for developing the national economy of the Far East, the proportion of such investments in agriculture continues to remain low. Thus, during the Ninth Five-Year Plan it increased from 11.1 to 13.5 percent in Khabarovskiy Kray. On the average for the country, the proportion of agriculture with regard to the overall volume of capital investments during the Ninth Five-Year Plan amounted to 26 percent and during the Tenth Five-Year Plan -- 27 percent.

Although substantial progress has been achieved in each kray and oblast in the Far East in increasing the production of crop husbandry and livestock husbandry products, nevertheless this production is inadequate owing to the development of the BAM zone and the raised requirements for food products. In order to solve this problem, we are of the opinion that the complex program "Far East Agriculture" must be developed. This program must reflect the methods to be employed for creating the region's food base, based upon improvements in the disposition of agriculture and agricultural specialization and upon the introduction of more efficient economic levers for controlling the agroindustrial complex.

For the period up until complete settlement and development of the territory adjoining the BAM, one source for the production of products which are in high demand could be the subsidiary agricultural enterprises of construction projects, combines and railroad terminals. Such an approach will permit the agricultural development of lands without having to await completion of the stage given to organizing the sovkhozes and it will make it possible to maneuver the labor resources extensively, thus ensuring that the population is supplied with difficult to transport and perishable products even during the construction period. The rapid and efficient exploitation of minerals in the zone of the mainline will be

determined to a considerable degree by how quickly it will be possible to create an agricultural base there for the production of milk, potatoes, vegetables and crop husbandry products; by which economic mechanism will be employed for the efficient functioning of the agroindustrial enterprises created; by the manner in which the problem concerned with the flow of labor resources and lowering the rates of personnel turnover.

Retention of the population in the rural areas is a major concern with regard to creating a stable food base. However, substantial changes have not taken place in the retention of migrants who have come to the rural areas of the Far East. The movement of one family from the central oblasts to Komsomol'skiy Rayon, for example, costs the state, taking into account the living arrangements in the regions undergoing development, 25,000 rubles. The problems concerned with retaining labor resources and reducing their turnover are especially acute in the Far East owing to the fact that the stern natural conditions which prevail here bring about additional expenditures for heating, clothing, food and, it follows, they raise the cost of living. Moreover, the real per capita income for the population in the region is only slightly higher than that in the European part of the USSR. In addition to the southern zone of the Far East, where a majority of the agricultural crops are being grown at the present time, the natural conditions found in a considerable portion of the territory adjoining the BAM zone, in the rayons of Amurskaya Oblast and Khabarovskiy Kray, also permit the production of vegetables, potatoes and many forage crops.

When determining the regions to be employed for producing the different types of food products, it should be borne in mind that the existing differentiation in soil-climatic conditions for the BAM is reflected in the physiological processes taking place in the human organism and that it will lead to a differentiation in the requirements for food products. It is manifested both from a quantitative standpoint (calories) and from a qualitative standpoint (proteins, fats, carbohydrates, vitamins and the ratios between them). According to data supplied by G. Geller (Institute of Nutrition of the USSR AMN [Academy of Medical Sciences]), the average per capita calorie requirement for the population is 3,204 calories for the southern and central portions of the Far East and 3,600 calories (compared to an average norm for the USSR of 2,950 calories) in the northern portion. Studies carried out at the Blagoveshchensk Medical Institute have shown that potatoes, beef and pork produced in Zeyskiy Rayon are characterized by reduced amounts of phosphorus, calcium and tyrosine and also by microelement deviations. Hence, in addition to introducing appropriate microadditives here, the consumption of locally produced products must necessarily be combined with the consumption of products imported from other regions of the Far East and the country as a whole.

In the gross output structure for agriculture in the Far East, according to 1977 data, crop husbandry accounted for 56.1 percent and livestock husbandry -- 43.9 percent. The present level of development for agriculture and the food industry makes it possible to satisfy the meat requirements of the region's population, using local resources, by 26 percent, animal oil -- by 32, vegetable oil -- by 78, grain and dairy products -- by roughly 40, vegetables -- by 55 and potatoes -- by 70 percent*.

* See SIBIRSKIY GEOGRAFICHESKIY VESTNIK [Siberian Geographic Herald], No 2, 1976, pp 7, 22.

The task of creating a stronger agricultural base requires the development of 1.5 million hectares of land. Under the conditions found in the Far East, the placing in operation of such land requires land reclamation operations and the carrying out of work in advance of such operations. Stable yields can be obtained only if a complex approach is employed in carrying out the land reclamation work, a complex which includes both drainage and irrigation. Thus, in combination with the use of chemical processes, mechanization and the use of new varieties, this will promote the transformation of the region from a zone of risky farming into a zone of guaranteed farming. According to available computations carried out at Dal'giprovodkhoz, the expenses for developing 1 hectare of reclaimed land in Khabarovskiy Kray amount to 16,200 rubles and for the entire land reclamation program -- 25 billion rubles. Considering the present work rates, a great amount of time will be required for developing the lands in this same Khabarovskiy Kray.

Specialization in the production of grain crops and soybeans (74.8 and 65 percent respectively in Amurskaya Oblast) is clearly defined throughout the region. Primorskiy Kray supplies mainly rice, grain crops and soybeans (18.1 percent of the overall volume). Potatoes, vegetables, meat and milk are being produced in all areas and the proportion of the appropriate krays and oblasts is stable. Moreover, a trend is being observed in which Kamchatskaya, Sakhalinskaya and Magadanskaya oblasts are playing an increasing role with regard to supplying the population with potatoes and vegetables. Primorskiy Kray is singled out in terms of the amount of land being used for the cultivation of vegetables and potatoes and Amurskaya Oblast -- forage crops. At the same time, forage crops occupy the greatest proportion of the structure of the areas under crops in Sakhalinskaya, Kamchatskaya and Magadanskaya oblasts and thus it is by no means an accident that these oblasts are included among the country's leaders in terms of milk yield per cow.

The production and sale of products has developed in conformity with the disposition of agriculture. In the production of grain per capita of the population, Amurskaya Oblast is already addressing those tasks established by the July (1978) Plenum of the CC CPSU for 1990. At the present time, the production of potatoes has increased considerably. In the Far East it has reached such a level that, assuming the availability of modern facilities for storing them and reducing losses during the winter and spring periods, the region, by means of internal redistribution, is capable of fully satisfying the requirements of the entire population, including the BAM zone.

The situation is more complicated in the case of vegetables. Their production, notwithstanding the exceptionally favorable natural conditions found in the region's southern zone, remains at a low level. Among the region's krays and oblasts, vegetable production fluctuates from 17 in Magadanskaya Oblast to 94 kilograms per capita in Amurskaya Oblast. The consumption of vegetables, taking imports into account, amounts to from 83 kilograms in Amurskaya Oblast to 131 kilograms in Magadanskaya Oblast. Restraining factors in the development of vegetable production include the weak mechanization of laborious processes and great losses in the storage and processing of the vegetables.

Vegetable production operations in greenhouses are developing at insufficiently rapid rates, despite the fact that such operations should play a principal role in

supplying green produce for those living along the BAM route. According to data supplied by the Vladivostock Branch of IEI DVNTs AN SSR [Institute of Economic Studies of the Far East Scientific Center of the USSR Academy of Sciences], there are 0.04 square meters of winter hothouse space for each resident in the Far East, or 12 times less than the best norms. Overall, 1.8 kilograms of vegetables are grown on the average on sheltered ground for each inhabitant of the region.

The zonal requirements for potatoes and vegetables, as indicated by computations, can be fully satisfied by means of local production. This requires that the area sown in vegetable crops be increased in the immediate future to 39,000-45,000 hectares, compared to the present 24,000 hectares and in the case of potatoes -- to 75,000-80,000 hectares. This problem can be solved by changing the structure of the area under crops, raising the mechanization of laborious processes, increasing the deliveries of herbicides for treating the plantings and constructing new storehouses, freezers and processing points. Naturally, this will require additional capital investments. In order to supply the local population with vegetables during the winter period, additional hothouses must be built.

Complications exist in the Far East at the present time with regard to supplying the population with meat products. For example, meat production using local resources on the average does not exceed 33 kilograms per capita throughout the region, with the exception of Amurskaya Oblast where this indicator is higher -- 54 kilograms in 1978*. At the present time, an average of 40 kilograms of frozen meat is being imported from other economic regions for each inhabitant of the Far East. The existing structure for the meat balance in the Far East does not conform with the average union structure. For example, hog production and poultry production, which are distinguished by brief periods for obtaining output, have low proportions in the region: 31.3 percent (34 percent for the country) and 9.4 percent (11 percent for the country) respectively. The problem can be solved during the first stage through the rapid construction of broiler poultry factories and raising poultry meat to 20 percent or more in the meat balance structure (in the U.S.A., the proportion of poultry meat exceeds 22 percent).

The low rates of development for hog production and poultry production, despite the fact that these branches are less labor consuming and capital-intensive compared to other branches, are associated with a shortage of concentrated feed or, to be more exact, with a lack of balance in terms of protein. As a result, when there is a feed shortage there is an overexpenditure per unit of output and the production costs increase. In the Far East, distinct from other regions throughout the country, the principal supplies of soybean cake meal are concentrated and great opportunities exist for obtaining fish meal. These components, assuming the availability of other micro-additives, make it possible to solve the problem of balanced feed rations and, it follows, achieving higher rates of development for hog production and poultry production in the region.

In connection with consolidating a population in the BAM zone, great importance will be attached to the production of whole milk products. According to data supplied

* According to computations carried out by the Vladivostock Branch of IEI DVNTs AN SSSR, by 1990 the meat requirements for the Far East will amount to 630,000 tons, including the possibility of 370,000 tons being obtained from local sources.

by the Institute of Nutrition of the USSR AMN [Academy of Medical Sciences], the overall volume of whole milk which must be produced on the spot for the Far East amounts to 185 kilograms per capita, plus 310 additional kilograms of milk for the production of the computed quantity of cheese and butter. The solving of this problem is considered to be the most complicated part of the problem concerned with creating a stable food base. It can be solved only within the framework of the region as a whole. However, such an approach is not always supported by the economic specialists in the krays and oblasts, who quite often are guided by their own local interests.

The prospects for developing the Far East in the foreseeable future are associated with specialization and the disposition of agricultural production throughout the region. Taking into account the limited nature of the arable land and the need for supplying the zone with difficult to transport and perishable products, obtained by means of local production operations, the possibility of converting over to regional-wide specialization and agricultural dispersal is considered feasible. This will also make it possible to create a feed base for dairy cattle husbandry as a result of improvements in the structure of the areas under crops.

At the present time, the low proportion of forage crops in the structure of the area under crops does not ensure a stable feed base and this is restraining growth in both the qualitative and quantitative indicators for the development of dairy cattle husbandry. In order to satisfy the requirements of the growing population of the Far East for whole milk and dairy products, a sharp increase is required in the production of feed. We carried out computations which provided for natural growth in the population and a mechanical increase in the population taking into account the construction of BAM. The normatives were based upon work carried out at the Institute of Nutrition of the USSR AMN. These computations revealed that in order to satisfy the Far East requirements for whole milk products, the number of cows in Khabarovskiy Kray must be increased threefold by 1990, in Primorskiy Kray -- by a factor of 1.6, while in Amurskaya Oblast the existing rates for increasing the number of cows can be maintained. However, if a feed deficiency is covered by means of feed production in Khabarovskiy and Primorskiy krays, then more than 650,000 additional hectares of agricultural land will have to be occupied. The solving of the problem under review, with regard to regional-wide specialization and cooperation in the southern zone of the Far East, will make it possible to realize a uniform increase in the number of animals (somewhat greater rates in Amurskaya Oblast and Khabarovskiy Kray). Amurskaya Oblast will subsequently supply more than 40 percent of the milk deliveries in the region. Even with such an approach being employed for the region as a whole, 500,000 additional hectares will have to be planted in forage crops, that is, the area will have to be increased almost twofold.

In the near future, owing to a weak land reclamation base, no opportunity will exist for expanding the forage crop areas to the level required by means of an increase in the arable land. Thus the structure of the area under crops should ideally be reexamined and the proportion of forage crops increased sharply to roughly 45 percent by reducing the commodity production of grain and soybeans in the Far East and increasing the areas sown in these crops in other regions of the country. Based upon computations carried out at the All-Union Scientific-Research Institute of Corn, in the steppe rayons of the Ukrainian SSR it is possible to obtain 15-20 quintals of soybeans per hectare and from irrigated lands -- up to 30 quintals per

hectare. Wheat constitutes a small proportion of the overall volume for the RSFSR (in 1978 -- 1.8 percent, including 0.03 percent in Khabarovskiy Kray).

Computations and experience have shown that in the region's southern zone, including BAM, conditions exist for satisfying the feed requirements of livestock husbandry. According to data obtained from the Zeyskiy Support Base of the All-Union Institute of Crop Husbandry, under local conditions fodder beets furnish 770-830 quintals, turnips -- 700-900, rutabagas -- 220-300 and corn -- 410-510 quintals of fodder per hectare. The reason for the absence of a stable feed base in the Far East -- a shortage of cultivated pastures and plantations for forage crops (for the most part, use is still being made here of low productivity and inefficient natural haying lands).

The creation of a food base in the Far East must be carried out based upon a special purpose program for developing a common food complex for the entire region, one which calls for specialization in agricultural production, the introduction of a modern logistical base, satisfaction of the mineral fertilizer requirements and so forth. In view of the extreme far eastern conditions, only this type of approach will make it possible to convert over to the scientific programming of cropping power and not just for vegetables and potatoes but for forage crops as well. In addition, it will make it possible to transform the southern zone of the Far East, including BAM, into a zone for the guaranteed production of difficult to transport (primarily milk) and perishable food products (vegetables).

A successful solution for the problem of creating a food base in the Far East and its efficient operation presupposes further improvements in the economic mechanism. It must promote a reduction in production costs and in the output-capital ratio, raise the capital-output ratio and the profitability of agricultural output, eliminate shortcomings in price formation, control and in the organization of cost accounting, improve the system of material incentives and, in the final analysis, ensure growth in the production and efficiency of all spheres in the agroindustrial complex.

The conversion of sovkhozes over to complete cost accounting has made it possible to improve considerably all of their production-financial indicators and to uncover at the same time those problems for which solutions have not yet been obtained. This applies first of all to the system of material incentives, which in the Far East, in our opinion, must not be a copy of the generally accepted system. It is our opinion that the wage coefficient must first of all be defined more precisely, the agricultural enterprises must be authorized to use all of the wage fund savings for establishing additional payments for the wage rates, the size of the material incentive fund, limited to 12 percent of the annual planned wage fund, must be increased and a number of other measures aimed at promoting the attraction and retention of personnel must be carried out.

The effective functioning of the agricultural enterprises created within the BAM zone is greatly dependent upon the validity of the procurement prices and upon the degree to which they conform to the socially necessary expenditures. Short of negating the importance of the intra-enterprise reserves for lowering production costs, improving labor productivity and raising profitability on this basis, it should be borne in mind that the maintenance of the indicated rates for the

reproduction of output is possible only for the profitability level embodied in the price, in the amount of 50-60 percent (the differentiation is caused by a change in the normative depending upon the farm specialisation). In 1978, the sovkhozes in Primorskiy Kray operated at a loss and the profitability level for kolkhozes in Amurskaya Oblast was eight percent and for the sovkhozes -- 16 percent. The production of agricultural products at sovkhozes in Khabarovskiy Kray was on the whole unprofitable and at kolkhozes in Primorskiy Kray -- profitable (+6.5 percent).

We are of the opinion that the following actions must be taken in order to create the conditions required for the expanded reproduction of agricultural output in the Far East: first of all, the procurement prices for milk, which continues to remain unprofitable, should be regulated and they should be differentiated by means of specialization; the price level for soybeans should be raised and it should be differentiated taking into account the natural-economic factors (being a profitable crop, soybeans, owing to a low cropping power, quite often furnishes less profit per hectare of sown area than do grain crops). Secondly, the krays and oblasts must be permitted to improve the price ratios for the various agricultural products within the limits of their sum total (for example, the prices for cucumbers and greenhouse tomatoes are almost identical and fail to stimulate the production of the latter, since the expenses required for growing them are higher). Thirdly, in the case of a concentrated arrangement for many newly organized agricultural enterprises in the BAM zone, individual procurement prices should ideally be employed for these farms, prices which will make it possible to cover the expenses involved and to create savings and corresponding economic incentive funds.

An important trend with regard to further improving the control over agricultural production is that of creating agroindustrial associations. Under the conditions found in the Far East, the concentrated disposition of agricultural production requires the organization of agroindustrial enterprises and associations which encompass the production, processing and sale of agricultural products. These associations must sell their products to the state based upon the established procurement prices, but the internal prices must be differentiated so as to create cost accounting stimuli for all of the farms, in the interest of achieving the best utilization of material and labor resources.

Thus, in order to solve the problem concerned with creating a stable food base in the Far East, it will be necessary to carry out a reorientation of agricultural specialization and to transform the region's southern rayons into a large base for dairy and beef cattle husbandry and for developed vegetable and potato production.

During this modern stage, we are of the opinion that management must call for the material and financial resources to be concentrated in a single organ of control for the region. This will make it possible to coordinate the special purpose programs and, as a result, to make better use of the capital investments in agriculture. The solving of these and a number of other problems confronting agriculture in the Far East will create additional opportunities for raising the efficiency of agricultural production and, in the final analysis, to meet the requirements of the Far East workers for the principal food products by means of local production operations, as required in the decisions handed down during the July (1978) Plenum of the CC CPSU.

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INTRODUCTION OF NEW TECHNOLOGY

INDUSTRYWIDE FINANCING OF SCIENTIFIC-TECHNICAL PROGRESS

Moscow VOPROSY EKONOMIKI in Russian No 8, Aug 80 pp 31-39

[Article by K. Kedrova]

[Text] Important changes have been made in the system for financing scientific-technical progress by the decree of the CPSU Central Committee and USSR Council of Ministers entitled "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Efficiency and Work Quality." Especial emphasis should be put on the new approach to the mechanism for supplying financial resources for scientific-technical development of production, which is manifested in enhancement of the cost-accounting motivation of collectives of enterprises (associations) and scientific-technical organizations to speed up scientific-technical advance and to make efficient use of the funds assigned to creating, putting into production and applying new technology. Paramount among the measures envisaged by the decree are the transition to financing scientific-technical progress in the industrial sector with the resources of the industrywide unified fund formed from the profit of subordinate industrial enterprises. In that fund are pooled the industry's resources for scientific research projects, the resources of the fund for putting new technology into production, and also budget appropriations to develop that industry's science.

Among the shortcomings of the present method of financing scientific-technical progress we should mention first of all the lack of an effective linkage of the industrywide mechanism for financing the "science--technology--production" cycle with profit, which constitutes one of the principal forms of the final economic result of utilization of scientific-technical achievements in production. Creation of the unified fund for financing scientific-technical progress in the industry so as to unify the various sources of funds for financing new technology will make it possible to link together the stages in the "research--production" cycle into a unified financial-economic complex, to mobilize all moneys earmarked for that purpose and on that basis to conduct a more flexible financial policy in the sphere of the industry's scientific-technical development.

The transition to profit as a source of supplying financial resources for industrywide projects of creating, putting into production and applying new technology makes it easier to establish a direct relation between industrywide expenditures for development of science and technology and the economic benefit obtained by enterprises from the production and application of the new technology in the form of additional profit. The planned expenditures related to the industry's scientific-technical development will now circulate within the limits of the industry's profit.* This method of financing scientific-technical progress in the industry will make it possible to increase the effectiveness of feedback in the "science--technology--production" system.

It is especially important to creating stable economic conditions for development of science and technology and for application of their advances to production that the transition envisaged by the decree be made to the methods of long-term financing of measures for scientific-technical development of production and that the principle be implemented of "pooling" the funds annually allocated by the industry to develop science and technology. The resources of the unified fund are earmarked, and should they not be used in the current year (5-year period), they are not confiscated, but are carried over to the next planning period. This ensures not only stability, but also high maneuverability of the financial mechanism for management of the industry's scientific-technical development.

The effectiveness of financing scientific-technical progress is determined not only by the economically sound sources for financing the development of science and technology, but also by such factors as selection of the base used in formation of the targeted financial funds, establishment of the quantitative value of the rate of transfers to the targeted funds so as to guarantee the necessary money resources required to develop the industry's science and to realize its advances in production, and also selection of the method by which the transfers are to be made to the special-purpose fund.

Selection of an economically sound normative base for formation of the YeFRNT [Unified Fund for Development of Science and Technology] has fundamental importance to enhancing the effect of the financing mechanism on speeding up scientific-technical progress and on raising the efficiency of

* Planned outlays for development and application of new technology will not be included in the production costs of industrial output. Nevertheless, it must be taken into account that at industrial enterprises the planned sources for financing measures under the head of new technology are not the only sources for reimbursement of actual outlays to put into production and apply new technology (not covered by the budget for placement of the resources of specific funds). As a rule these outlays are covered from the funds of the principal activity (working capital), from centralized capital investments and from other sources.

social production on that basis. An analysis conducted in the machine-building industries into the quantitative relationship and dynamic behavior of the principal cost indicators of development of industrywide science and the indicators of the development of production (commodity output, sales, normative output, net output, profit, wages, the value of fixed capital) has shown that the indicators displaying the closest economic relationship are the volume of outlays for R&D [literally "scientific-research and experimental-design developments"] and the volume of commodity output. To ensure the organic unity and stability of the indicators of the volume of outlays for science and the indicators of the volume of financing of scientific-technical projects, one and the same indicator should be adopted as the normative base for formation of the YeFRNT.

Departure from this unity has an adverse effect on the effectiveness of managing the processes of the development of science and technology and realization of their achievements in production. In 1969 in the electrical equipment industry, for example, the volume of commodity output was selected as the basis for planning the volume of R&D, while the volume of industrywide profit was taken as the basis for financing those projects, and the result was disruption of the stability of the planned rate for financing scientific-technical projects. In essence only one planned standard was in effect--the standard volume of R&D. The standard of the size of the YeFRNT (13 percent of profit) adopted at the outset of the experiment subsequently lost the status of a standard and was "pushed up" to meet the necessary amount of financing because of the instability of the indicator of the volume of industrywide profit as a normative base.

The quantitative value of the standard used to determine the amount of R&D and the standard for determining the amount of resources of the YeFRNT will differ, since some of the R&D is covered by financial resources received from other industries and departments under business contracts.* At the same time a portion of the resources of the unified fund are assigned to reimburse the cost of putting scientific-technical advances into production.

The prospects for development of industrial production by manufacturing efficient new types of technology and applying advanced manufacturing methods and highly productive equipment should be taken into account in determining the quantitative value of rates governing transfers to funds for financing the industry's scientific-technical development. The rates should reflect the specific nature of the development of science and technology in the industry and of realization of its achievements in physical production as well as progressive shifts in the technical facilities furnished to science in the industry that enhance the efficiency with which research and development is carried on. The method of making transfers to the YeFRNT, then,

* Under a decision of the USSR State Committee for Science and Technology and the USSR Ministry of Finance, especially important scientific research projects requiring sizable outlays may be financed from the state budget.

should be such as to guarantee stable economic motivation of industrial enterprises to systematically raise the technical-and-economic level of production by manufacturing efficient forms of technology whose adoption as products and whose manufacture are in turn possible thanks to the introduction of highly productive and efficient technology and equipment.

The size of transfers to the industrywide fund for development of science and technology should in our opinion be made directly dependent on the scientific-technical level and quality of the product the enterprise produces and the distribution of its commodity output among quality categories in order to strengthen the cost-accounting motivation of enterprises to speed up the technological development of the industry. The industry's average rate of transfers from profit to the unified fund for development of science and technology is the principal planning standard used as the basis for calculating the total amount of contributions to the unified fund for development of science and technology for each VPO [all-union industrial association].

When the system of differentiated transfers as a function of quality, efficiency and the scientific-technical level of the product is being worked out, it is indispensable that the value of the rate be set for each group of products of the VPO. The sum total of transfers from profit to the YeFRNT should be distributed among the particular groups of products produced in the subindustry (by quality categories and the year when production commenced) in such manner that the highest percentage of transfers will be made for products in the second-quality category. Combined with the present procedure of deductions from the price of such products, this will make it possible to erect a reliable barrier to the manufacture of outdated and low-efficiency technology (which not uncommonly is highly profitable to the manufacturer).

The lowest rate of transfer should be set on products in the superior category bearing the quality emblem in order to encourage its expanded production. Products in the superior category which the enterprise is putting into production for the first time in the USSR and also highly efficient products created by using inventions should in our opinion be exempted from contributions to the YeFRNT for the first 2 years after series production begins. Products bearing the quality emblem which have been put into production by the enterprise but which are already manufactured elsewhere in the country might be exempted from the contributions only for the first year after series production is organized. This system of financial benefits to be granted both to the VPO as a whole and also to enterprises actively participating in the technical development of the entire national economy will make it possible to create infective incentives for speeding up the industry's scientific-technical development.

The actual size of the total amount of transfers and their differentiation by categories of products within the VPO (industrial associations) and within individual enterprises (associations) should be calculated so as to

take into account the peculiarities of technical progress in the subindustry and the economic conditions under which the given economic complex operates. This method of forming funds earmarked for financing NTP [scientific-technical progress] in the industry affords the possibility, in our view, of fuller realization of the fundamental principles of the decree on strengthening the influence of the economic mechanism on increasing production efficiency.

We have developed sample scales of deductions to the YeFRNT for a number of machinebuilding industries so as to take into account their specific features with a view to realizing this method of forming the fund. We give below scales for enterprises in the industry of construction, road and municipal machinebuilding.

Sample Scale of Rates of Transfers From the Enterprise (Association) to the YeFRNT (in percentage of commodity, net and normative output)

	Years Product Has Been Produced Since It Was Put Into Production							
	1st	2d	3d	4th	5th	6th	7th	8th
Products bearing the quality emblem	0	1	2	2	2	3	3	3
Including:								
Products based on inventions	0	0	2	2	2	3	3	3
Products put into production for the first time in the USSR	0	0	2	2	2	3	3	3
Products in the first-quality category	4	4	4	4	4	4	4	4
Products in the second-quality category	6	6	6	6	6	6	6	6

Calculations at enterprises which have converted to the new conditions for financing have shown that the use of the scale proposed here makes it possible to redistribute transfers to the YeFRNT within the limits of the total amount in order to stimulate renewal of products being produced. The interconnection between the technical level of the product produced and the size of transfers to the industrywide fund for financing scientific-technical progress in 1978 can be followed for the enterprises of the Ministry of Construction, Road and Municipal Machinebuilding (in percentage):

Enterprises	Relative Share of Products Produced First Put Into Production in 1976-1978 Period	Transfers to YeFRNT* Under Present Conditions: Relative to Commodity Output	Under Present Conditions: Relative to Profit	According to Proposed Scale: Relative Commodity Output	According to Proposed Scale: Relative to Profit
Metallorukav Production Association	14.4	2.30	21.3	2.5	23.0
Fan and Ventilator Plant	19.3	0.18	1.9	1.0	13.0
Stroymash Production Association	37.7	2.20	12.9	2.0	10.8
Machinebuilding Plant imeni M. I. Kalinin	9.2	1.90	6.0	5.0	16.2
Pnevmostroymashina Plant	4.1	2.30	7.7	8.0	28.9

* The volume of commodity output was the indicator taken as the base for calculating the volume of the YeFRNT, since in the industries where the calculations were made net output standards had not yet been devised for the entire list of products produced.

As we see from the figures in the table, the transfers to the unified fund on the basis of this scale were barely a third as much for the Stroymash Association, where the relative share of high-quality new products was 37.7 percent, as it was for the Pnevmostroymashina Plant, where the relative share of new products was 4 percent. By setting up the system of differentiated rates of transfers to the YeFRNT as a function of the progressiveness of the products the enterprises produce will make it possible to furnish financial benefits to enterprises actively participating in the technical revamping of the entire national economy. The system of differentiated rates of transfers from profit makes it possible to implement the principle of forming funds earmarked for financial stimulation of scientific-technical progress not "according to the base," but as a function of the technical-and-economic level of production the enterprise has achieved. These financial norms will thereby have a stronger effect in speeding up rates of renewal of productive capital. "The purpose of a standard," S. Sitaryan has observed, "is to ensure a constant rise in the motivation and responsibility of all enterprises in the industry to improve the qualitative indicators of their performance."*

* S. Sitaryan, "Finance and the Economic Mechanism," SOTSIALISTICHESKAYA INDUSTRIYA, 17 May 1980.

In drafting measures to improve the mechanism for financing NTP it is important to take into account that the unified fund for development of science and technology should be transformed from a money "tank," which to a certain degree arbitrarily stores up the financial resources of the industry as a function of factors which have no bearing on encouragement of new technology, into an active financial lever for managing scientific-technical progress.

In the industry's conversion to the new conditions for financing scientific-technical progress it would be wise, in our view, to distinguish the following stages: 1) determination of the industry's average rate of transfers to the YeFRNT and its total size for the planning period (5-year period, year) on the basis of the aggregate need for money to develop the industry's science and technology and to apply scientific-technical advances (on the basis of report data and taking into account the necessary growth of expenditures); 2) calculation (on the basis of the industry's average relative size of the YeFRNT) of the planned amount of resources of the unified fund earmarked for the all-union industrial association so as to take into account the technical-and-economic level of development of the subindustry in the planning period; 3) distribution of the planned amount of funds transferred to the YeFRNT at the level of the subindustry (VPO) among enterprises as a function of the rate of renewal of products being produced and their technical-and-economic level.

The methods of forming the YeFRNT should be improved simultaneously with improvement of the procedure for targeted use of this fund's resources. This necessitates developing both a methodology and also methods specific to the various industries for devising scientifically sound norms governing distribution of the financial resources by purposes and stages of the "research--production" cycle so as to take into account the shifts forecast in development of the technical capability being developed by the given industry and adherence to definite proportions between the various purposes of technical progress and stages in the "research--production" cycle. Observance of this optimum relation on the basis of scientifically sound distribution of financial resources will make it possible to guarantee the industry's scientific-technical development in conformity with plans and proportionality between the development of science on the one hand and the development of production on the other.

The effectiveness of the mechanism for financial management of scientific-technical progress depends in large part on working out in advance the financial requirements for various purposes or groups of expenditures (research, development, putting scientific-technical advances into production) and on their linkage to allowances for financing with the resources of the unified fund for development of science and technology. One might take as an initial basis for working out the system of standards governing earmarked financing of the industry's scientific-technical development the actual relationship in amounts of financing from various sources that have been formed in practice (before formation of the YeFRNT: 1) budget funds

previously allocated to finance exploratory theoretical research, to create the scientific-technical backlog and for projects on new topics; these projects are mainly related to development of the industry's science, which determines the prospects for technical progress in the industry over the following 10-20 years; 2) the funds of the industry itself (deductions from production costs) for scientific research projects appropriated for applied research and for product and process design and development with prospects of being put into production over the following 5-10 years; 3) resources of the fund for organizing the production of new technology, which are assigned to experimental design and process development to create new types of products (new technology) and also for work related to preparing and organizing series production of a new product over the planning period--the 5-year period.

As the measures envisaged by the decree are carried out, it is indispensable to take into account those adverse factors which could arise if a formalistic approach is taken to forming the YeFRNT and to the use of its funds, resulting from a mere mechanical pooling of different sources of funding for this purpose. As an analysis of the initial stages of conversion of the machinebuilding industries to the new conditions for financing NTP has shown, in certain of them this was the reason for a reduced amount of financing of projects to put scientific-technical advances into production and also of a reduced share of projects to build up the scientific-technical backlog. At the same time there was an increase in the volume of development projects never introduced and never completed.*

The planned financing form of managing the processes of creating and applying new technology (job orders), which is operative in the machinebuiding industries, does not entirely embrace as yet the stage of organizing series production of new types of technology and the stage of organizing their regular production in general. Thus the final stage of the "research--production" cycle often remains "left out." Yet the greatest difficulties arise in those final stages of the cycle because of the growing technical and technological complexity of the new means, instruments and subjects of labor created as well as because of the conditions of the economic passage of the experimental prototype from the sphere of science to the sphere of physical production.

There are objective reasons (in a number of cases the lack of reserve production capacities, the necessary materials or components, or inadequate level of skills of the labor force) why in the stage of putting scientific-technical advances into production a gap occurs in the unified process of creating and applying the advances of science and technology in production. At the same time the industry and the enterprises possess the necessary financing to ensure continuity and to speed up processes in the cycle of the "creation, production and application of new technology." An analysis of

* P. A. Sedlov, "Economic and Legal Problems of Planning and Encouraging Scientific-Technical Progress," VESTNIK AN SSSR, No 1, 1980, pp 37-38.

the use of special-purpose funds for financial stimulation of scientific-technical progress has shown that in those industries where there is a fund for organizing production of new technology and where unified funds have been created, their resources were underutilized year after year in a number of ministries, whereas assignments for creation and application of new technology were not altogether fulfilled.

Many enterprises were not motivated to use funds from the YeFRNT* and preferred either to "lay the burden" on the production cost by diverting their own working capital to reimbursement of the costs of putting new technology into production (wherever the level of production costs was not high) or to reduce the amount of new technology put into series production so as to reduce the adverse effect which the processes of putting new products into production has on the enterprise's cost-accounting indicators. All this evidenced the need to strengthen the connection between financial-and-economic methods of managing scientific-technical progress and the economic mechanism of industrial enterprises, which indeed was envisaged by the new decree. It is above all a question of enhancing the role of cost-accounting elements in the mechanism of financing scientific-technical progress.

The decision which has now been made to include in the total volume of output the value of projects of an industrial nature to put new technology into production and to apply new technology financed from the unified fund for development of science and technology eliminates the contradiction between the indicators used to evaluate the results of the economic performance of associations and enterprises and their right to spend centralized funds to put new technology into production.

The decree on improving planning and perfecting the economic mechanism has envisaged a strengthening of the influence of the benefit to the national economy of technology produced, taken as an indicator, on the mechanism for building up financial funds earmarked for technical development of production in the industry. A certain share of the economic benefit from the new technology created in the industry is to be assigned to reinforce the unified fund for development of science and technology as a portion of the sum total of incentive supplements for the manufacture of highly efficient types of new technology (15 percent). For instance, for the 11 machine-building ministries the proportion of the unified fund for financing scientific-technical progress resulting from transferring this part of the total amount of supplements for planned output of products bearing the quality emblem could increase to 3.5 percent of the total amount of resources in the YeFRNT in 1980.

Establishment of an economic connection between the mechanism for financing scientific-technical progress and the indicator of the national economic benefit from the creation of new technology and the cost-accounting

* Enterprises mainly use funds obtained from the YeFRNT to pay for development projects performed by other organizations under business contracts.

indicators of the benefit of using production resources in the given economic entity that reflect reduced costs on the basis of use of new technology, will make it possible to strengthen the influence of the financial mechanism on the effectiveness of scientific-technical progress.

The indicator of the national economic benefit of new technology is now being used in a number of industries to evaluate the effectiveness of using money allocated for the industry's technical development.* It is essential to strengthen the mechanism whereby this indicator exerts a planned influence in the stage of compiling financial plans, that is, when money is distributed from industrywide funds for development of science and technology among individual VPO, and also among particular directions of scientific-technical progress. In our opinion it would be wise if the indicator of the benefit from use of new technology (in the form of reduced expenditures of materials, energy and fuel for production of output) were taken into account when financial funds are allocated to enterprises and associations for purposes of technical improvement of production. This will also contribute to better orientation of the mechanism for management of scientific-technical progress toward the final national economic results of applying new technology and toward achievement of savings by using technically new means, implements and methods of labor.

It would help to guarantee that the indicator of the national economic benefit from use of technology has a real significance if a close connection were established between calculations of the indicator of the actual economic benefit and the indicators of reduction of standard costs and standard rates of consumption for all types of resources (labor, physical and financial) by virtue of application of new technology. This would serve as the basis for connecting the mechanism of furnishing financial resources to projects involving new technology in the "research--production" cycle and the indicators of the effectiveness of each group of expenditures to conduct scientific-technical projects relevant to the particular directions and stages of scientific-technical progress.

The transition to payment for R&D projects completed and accepted by the customer will contribute to further development of cost-accounting relations in the sphere of scientific-technical progress. A temporary lack of funds to perform scientific and technical development projects will be covered with money borrowed on the basis of credits from USSR Gosbank, which will unquestionably make it possible to enhance the economic responsibility of scientific organizations for effective use of financial resources. This transition is to be accomplished in all industries during the 11th Five-Year Plan.

Strengthening cost-accounting levers in the domain of creation and application of new technology imposes higher requirements on the economic soundness

* V. Astaf'yev, "System of Incentives for New Technology (Experience, Results and Prospects)," VOPROSY EKONOMIKI, No 1, 1980, p 53.

of compilation of cost budgets for each topic and specific programs, which serve as the basis for shaping plans for financing scientific-technical progress. Sizable departures of the outlays planned for the various projects (estimated cost) from actual outlays on the side of falling short of the planned amounts indicate that calculations of the standards used in planning outlays for R&D are not on a sufficiently high level. This in turn weakens the financial mechanism for managing NTP because financial resources are "frozen" and because the industry's financial resources "leak out" because they are partially confiscated into the budget in the form of the surplus of "income" over expenditures under budgets for performance of scientific research projects in scientific organizations.

The specific nature of scientific-technical activity in each stage of NTP must be taken into account in working out the system of financial standards used for management in the sphere of scientific-technical progress. Setting up a system of rigid standards for financing outlays for each type of project is not possible because of the specific nature of creative work and of the product of scientific-technical activity. At the same time the work standards in effect in the science of the industry pertaining to the conduct of standard projects make it possible to devise a system of consolidated financial standards for performance of projects in particular directions and stages of development of the industry's science and technology--on the basis of groups of expenditures. It would be wise if the financial standards were developed by groups of expenditures for the aggregate of projects of the same kind (scientific research projects, experimental design projects, and organization of the production of new types of technology). In determining departures of planned outlays for scientific-technical developments from actual outlays the calculation should also be made for the entire group of projects of the same kind. In our view this procedure would create a real basis for applying economically sound standards.

The absence of a system of planning calculations of the financial requirement of specific purposes tends in practice to disrupt the proportional relationship in development of particular stages and directions of scientific-technical development in the industry. At the level of the industry (and subindustry) there are no data on full costs in a breakdown into research, process design and development, product design and development, and production engineering conducted by scientific research organizations, design organizations and process engineering organizations. Figures of this kind are also lacking for research and development in the sphere of so-called "plant science." There are no precise figures on full actual costs for measures under the head of new technology at the enterprises of the industry. The procedure in effect for recording costs and the reporting forms in the sphere of financing scientific-technical progress do not even afford a possibility of discovering at the level of enterprises the full amount of expenditures related to the particular directions of scientific-technical progress, including funds under capital investments.

To work out standards for financing specific purposes will require appropriate organization of comprehensive recording and analysis of costs in the sphere of scientific-technical progress. Adoption of this kind of accounting is being held back not only because the methodology is lacking, but also because the personnel of scientific research, project planning and design, and process engineering organizations and industrial enterprises do not have a material incentive or full and reliable reporting on actual outlays for performance of scientific-technical measures. One of the reasons for the lack of this motivation is the existence of a secret mechanism of "self-insurance," which results from the factor of financial and economic risk.

Inadequate use of the capability of the planning mechanism to provide the financial guarantee against the risk related to the effect of the factor of indeterminacy results in a substantial discrepancy between figures on the estimated cost and the actual outlays to perform various R&D projects. The reason for this is that reliable data are lacking on full actual costs to conduct specific measures related to new technology at industrial enterprises.

In our opinion creation of earmarked financial reserves has great importance to increasing the effectiveness of the mechanism for financing scientific-technical progress, provided that normative methods of managing the processes of creating and applying new technology are strengthened. On the one hand this is a financial guarantee for coverage of an overrun of planned costs to carry out the measures of scientific-technical progress, and on the other it is a source of financing to cover outlays on measures whose need has arisen during the current period. The latter is related to the need to expand the interindustry exchange of scientific-technical advances and their application.

As a result of this interindustry exchange of highly effective scientific-technical solutions a sizable saving of financial resources can be achieved in the borrowing industries (thanks to economy in the conduct of research, experimental design, and so on). To encourage a strengthening of interindustry exchange of completed technical solutions and their application it would be wise to establish financial benefits and create economic advantages for enterprises and scientific-technical organizations of industries actively involved in making transfers of scientific-technical advances to other industries and rendering assistance in their application.

The transition to normative methods of financing scientific-technical progress, which presupposes not only the existence of economically sound norms for formation of industrywide funds for development of science and technology, but also application of a system of standards used in distribution of the resources of those funds among specific purposes (including incentive standards) so as to take into account the indicator of the benefit of the technology developed, will make it possible to strengthen the influence of the financial mechanism as a management tool on the processes of creating and applying new technology.

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